

## **REMARKS**

Applicants respectfully request consideration of the subject application as amended herein. This Amendment is submitted in response to the Final Office Action mailed April 7, 2005. Claims 1-12, and 27-38 are rejected. In this Amendment, Claims 1, 3, 4, 5, 6, and 27 have been amended.

### **35 U.S.C. § 112, Second Paragraph**

The Examiner has rejected claims 27-32 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. The Examiner finds the term “agent” to have a lot of meanings.

Applicant has amended claim 27 to point out that there it is the mask that is used to form the emitter stack acts to self-align the recess. For example, as taught by Applicant’s disclosure in the Specification page 6, the hard mask 134 that is used to create the emitter stack is used to create a self-aligned exposure portion of the substrate so that the recess 138 can be formed as a self-aligned recess. As stated in the disclosure, the “hard mask 134 acts as a self-aligning agent on one edge of the self-aligned recess 138.” In essence, the hard mask 134 acts as the mask that is used to form the recess 138.

### **Rejections under 35 U.S.C. § 102(e)**

The Examiner has rejected claims 1, 3, 4, and 7-11 under 35 U.S.C. §102(e) as being anticipated by Suzuki, (U.S. Patent No. 6,232,638 hereinafter “Suzuki”).

Applicant respectfully disagrees.

Applicant has amended the Claim 1, 3, and 4 (7-11 depend from Claim 1) to clearly point out that the recess is “immediately adjacent to the emitter stack” and that “the emitter

Suzuki and Applicant's invention. One reason for Applicant's invention being able to have the recess deposited immediately adjacent the emitter stack where the emitter stack and the recess share a boundary is Applicant's invention utilized a self-aligned recess. Suzuki did not teach or implement a self-aligned process.

In Figures 1-2 of Exhibit A, Applicant shows for clarification a non-self aligned process of etching that is used in Suzuki. In Figures 1-2, a photoresist mask is formed and implantation is done to form source/drain regions in the silicon substrate. Here, depending on how the mask is aligned, the source and drain regions may be uniform or not. This process relied heavily on alignment and accuracy of the forming of the mask.

In Figures 3-6, another non-self aligned process is used to make a device. In Figure 3, a gate is formed and a mask is then formed on top of the gate wherein the mask defines the gate. Implantation is done to form the device shown in Figure 4 where the polysilicon gate is formed. If the mask used to form the polysilicon gate is misaligned as is shown in Figure 5, the device shown Figure 6 will be formed where the source and drain regions are non-uniform and the device is defective.

Figures 7-8 illustrate a simple self-aligned process. A polysilicon gate is formed over the substrate and over the source and drain regions as shown in Figure 7. A photoresist mask is also formed that define regions to be implanted. Here, the polysilicon gate is also used as a "mask" that define the implantation regions (Figure 7). The alignment is easier in the this case. The photoresist mask can tolerate a bigger window of error in misalignment. The implant aligns itself to the polysilicon gate, thus the process is termed self-aligned. The source and drain regions are formed by self-alignment with respect to the polysilicon gate.

In Applicant's invention (e.g., Figure 4 of Applicant's invention), the mask 134 and the emitter stack 126 act to self-align the recess 138. Alignment is easier to control. There is

stack and the recess share a boundary.” The recess (e.g., recess 137) can be seen, for example, in Figures 3-5 of Applicant disclosure.

Applicant’s invention as recited in the pending claims is different from Suzuki. Suzuki did not teach a recess disposed adjacent or immediately adjacent the emitter stack. In Suzuki, the recess 116a can be viewed from Figures 4a-4d or a similar recess 216 from Figures 7a-7d. Clearly, the recess 116a or 216 is actually immediately adjacent to the isolation region 102 and separated from the emitter stack 114. Additionally, the recess 116a or 216 is between two isolation regions 102 and NOT between an isolation region and the emitter stack 114. In Suzuki, the recess 116a or 216 is separated from the emitter stack 114 by the isolation region 102. In the pending claims, the recess is immediately adjacent the emitter stack and no isolation region between them.

Applicant’s invention as recited in the pending claims is distinguished from Suzuki in that the recess is formed immediately adjacent to the emitter stack such that they share one boundary (see Applicant’s Specification, page 6, for example). In other words, a traditional isolation region that is typically located between the emitter edge and the edge of the recess (that forms a collector tab) is removed. This is possible because the recess that forms the collector tab is immediately adjacent the emitter stack. As taught in the Specification, Applicant disclosed a self-aligning process that allow the recess to be placed immediately adjacent the emitter stack. No isolation region is between the emitter stack and the recess.

A device formed using Suzuki would need the isolation region between the emitter stack and the recess because in Suzuki, a self-aligned process is not used to form the recess 116a. The isolation region would provide registration tolerance for the formation of the recess 116a.

Applicant submits Exhibit A to help the Examiner understands the difference between

thus no need for an isolation region to be formed between the recess 138 and the emitter stack 126 to account for misalignment when the recess 138 is formed. The etch and implant steps are both self aligned to ONE edge of the emitter stack 126.

Therefore, Suzuki '638 cannot anticipate Claims 1, 3, 4, and 7-11.

**Rejections under 35 U.S.C. § 103(a)**

The Examiner has rejected Claims 2, 5, 6, 12, 27-38 under 35 U.S.C. §103(a) as being anticipated by Suzuki, (U.S. Patent No. 6,232,638 hereinafter "Suzuki").

Similar to previously discussed, Applicant has amended the Claim 5, 6, and 27 (Claim 2 and 12 depend from Claim 1, and 28-38 depend from Claim 27) to clearly point out that the recess is "immediately adjacent to the emitter stack" and that "the emitter stack and the recess share a boundary." The recess (e.g., recess 137) can be seen, for example, in Figures 3-5 of Applicant disclosure.

Applicant's invention as recited in the pending claims is different from Suzuki. Suzuki did not teach a recess disposed adjacent or immediately adjacent the emitter stack. Additionally, the recess 116a or 216 is between two isolation regions 102 and NOT between an isolation region and the emitter stack 114. In Suzuki, the recess 116a or 216 is separated from the emitter stack 114 by the isolation region 102. In the pending claims, the recess is immediately adjacent the emitter stack and no isolation region between them.

Therefore, Suzuki '638 could have not suggested or made obvious Claims 2, 5, 6, 12, 27-38.

Applicant respectfully submits that for the reasons above, the pending claims are patentable over the above reference.

If the Examiner determines the prompt allowance of these claims could be facilitated by a telephone conference, the Examiner is invited to contact Mimi Dao at (408) 720-8300.

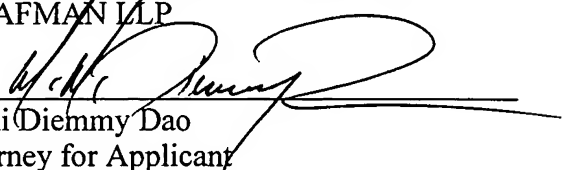
**Deposit Account Authorization**

Authorization is hereby given to charge our Deposit Account No. 02-2666 for any charges that may be due. Furthermore, if an extension is required, then Applicant hereby requests such extension.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR  
& ZAFMAN LLP

Dated: June 13, 2005



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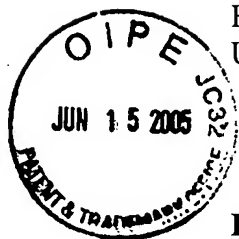


EXHIBIT A

Figure 1:

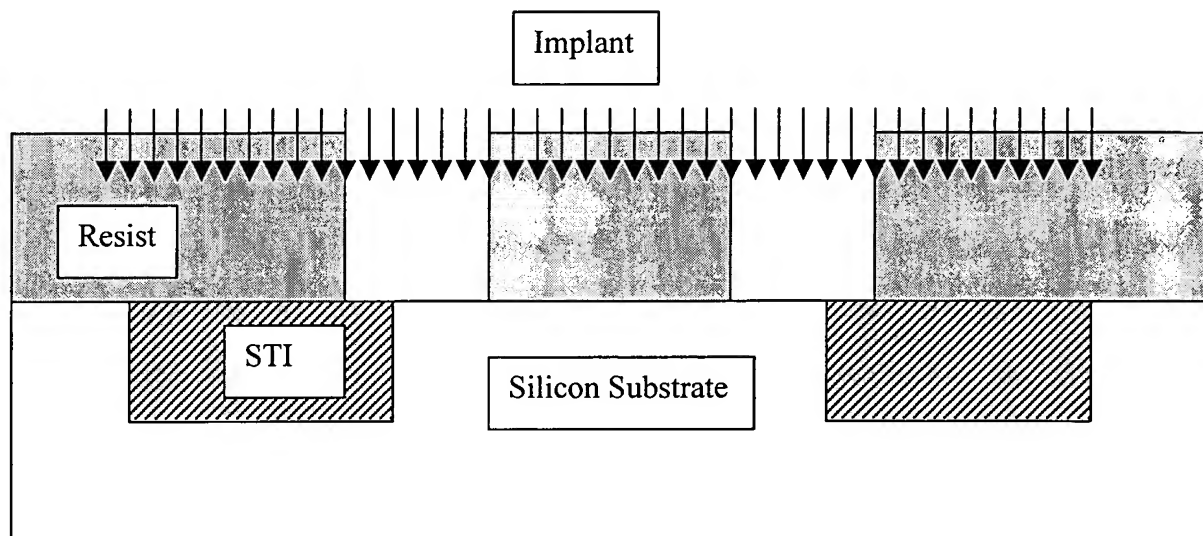


Figure 2:

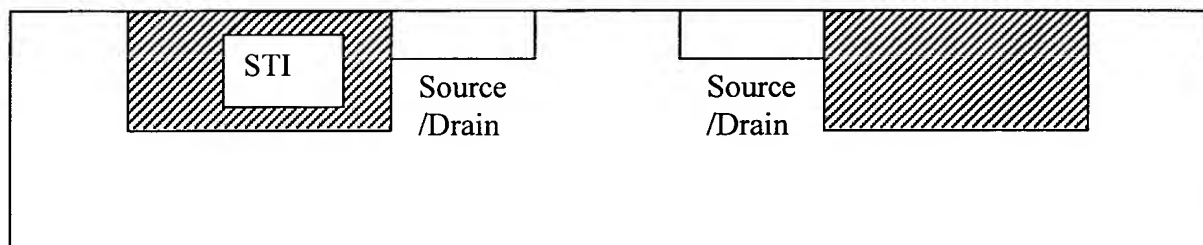


Figure 3:

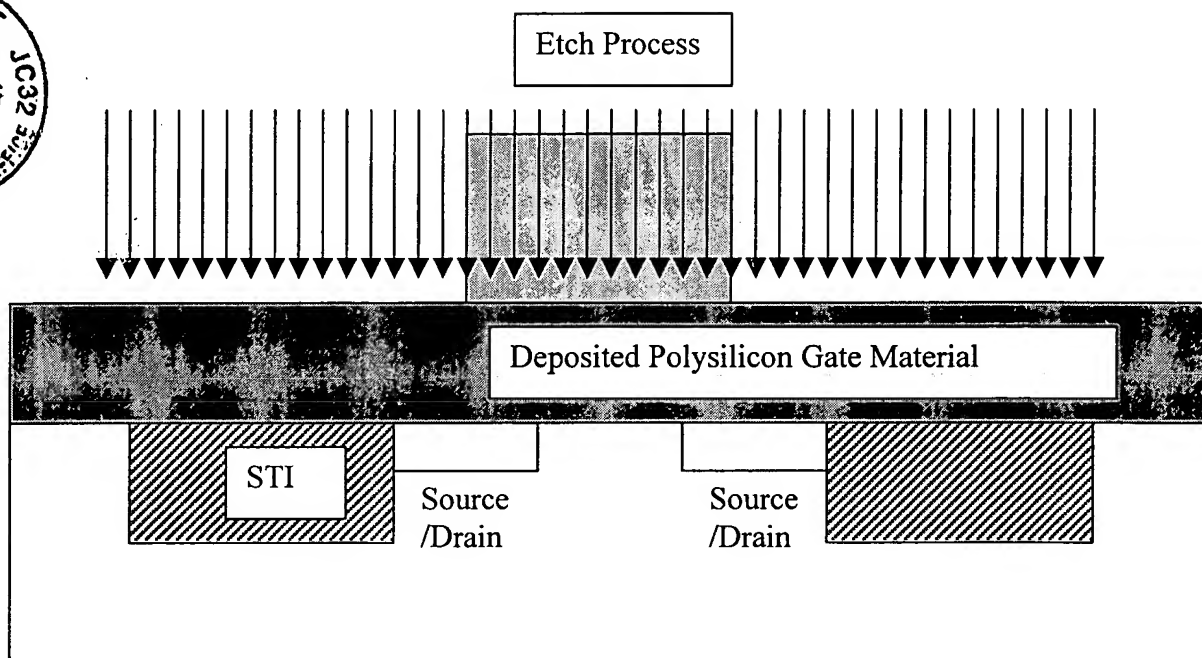


Figure 4:

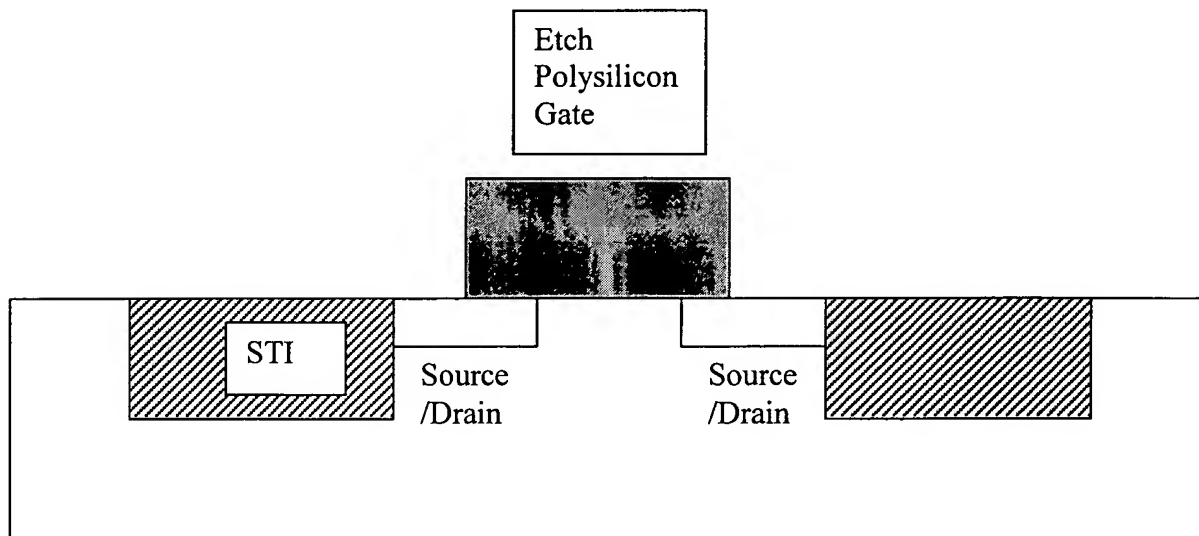


Figure 5:

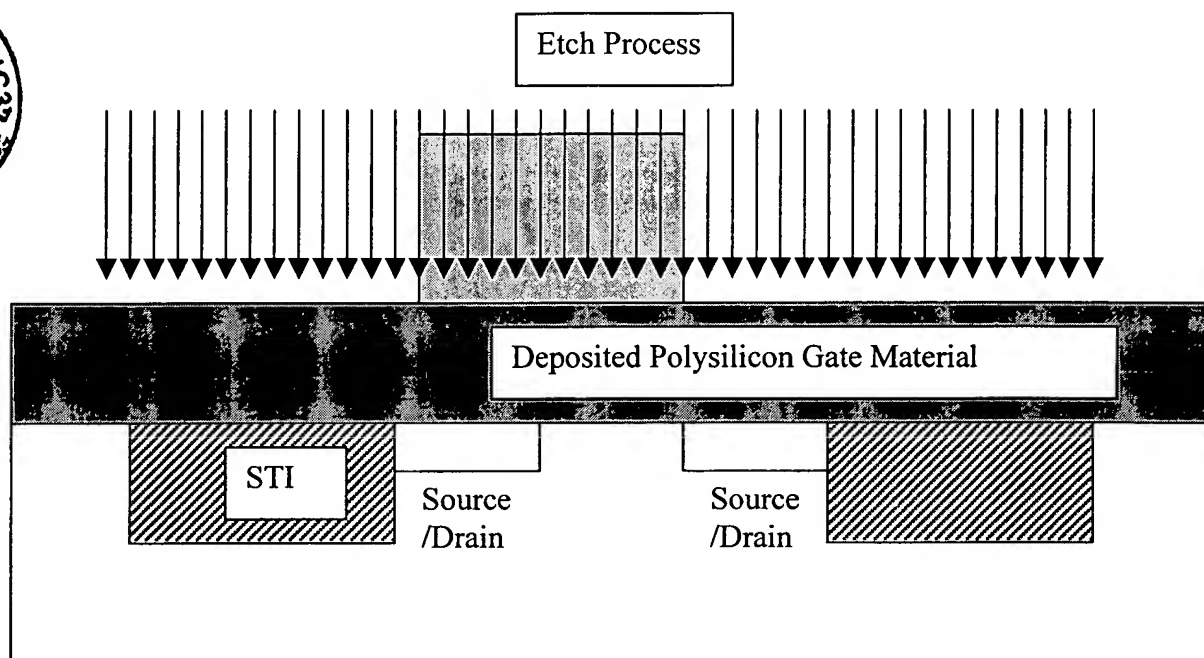


Figure 6:

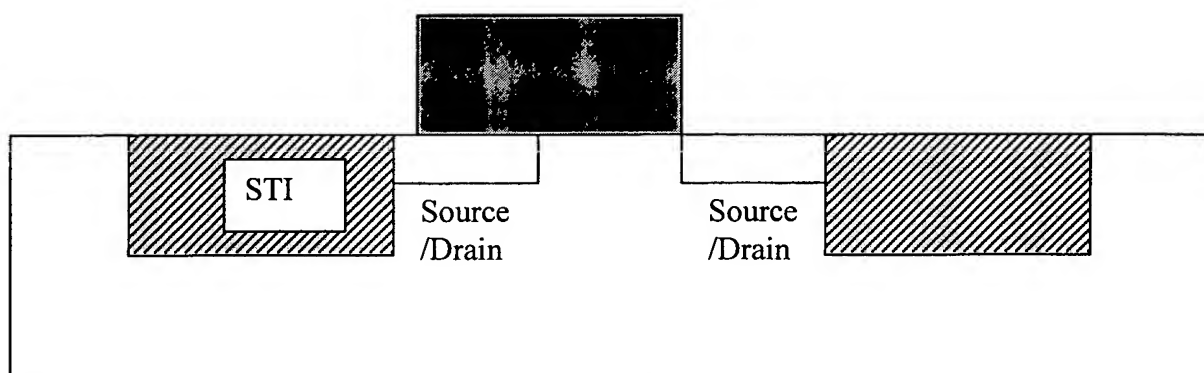
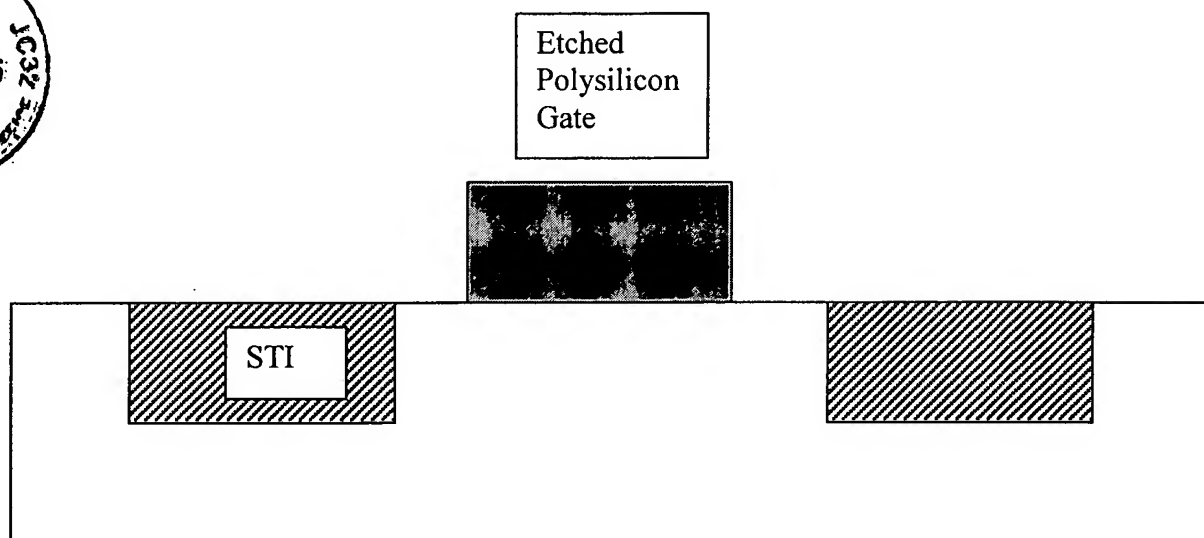




Figure 7:



The Source/Drain implant now is a very "loose" masking step with a lot of margin for miss-alignment and no implications

Figure 8:

